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| 09/517,579 | 03/02/2000 | Kazuya Hiratsuka | 0059-1208-0 | 4777 |

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OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C.
1940 DUKE STREET
ALEXANDRIA, VA 22314

| EXAMINER | |
|---|---|
| NGUYEN, HA T | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2812 | |

DATE MAILED: 05/01/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 09/517,579 | HIRATSUKA ET AL. | |
| | Examiner | Art Unit | |
| | Ha T. Nguyen | 2812 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *10 March 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *2-5,7-9,11-17 and 19-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2-5,7-9,11-17 and 19-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

## DETAILED ACTION

### *Notice to applicant*

1. Applicants' Amendment, Response to the Office Action mailed 2-6-03, and request for an RCE has been entered and made of record (Paper Nos. 21 and 20). Following is an Office Action responding to the request.

**Notes:** As promised, the examiner has, very carefully, reviewed the Applicants' Specification and the art of record in search for allowable subject matter. However, at this point, only the details concerning the dew point at the end of page 7 of the specification do not seem to be taught by the art of record.

### *Response to Amendment*

2. Applicants' arguments with regard to the rejections under 35 U.S.C. 103 have been fully considered, but they are not deemed to be persuasive. The response to these arguments have been shown in the Final Rejection ( Paper No. 12) and the Advisory Action (Paper No. 17) restated below and additional response will be incorporated in the modified ground of rejection given below.

Again, Applicants argued that Morimoto et al. (US Patent 4725927, hereinafter " Morimoto") "fails to disclose or suggest a method for producing an electric double layer capacitor 1) having the claimed organic solvent in the organic electrolyte, 2) having the claimed specific surface area of 100 to 3000$m^2$/g of the carbonaceous material of the electrodes, and 3) which is maintained at reduced pressure after the voltage is applied as set forth in claims 5, 12, and 20". The examiner disagrees, contrary to applicants' argument, Morimoto discloses substantially all the above limitations.

Concerning the claimed organic solvent in the organic electrolyte, Morimoto discloses the use of an organic solvent comprising sulfolane solvent, chlorobenzene , and among other things propylene carbonate or butylene carbonate (see col. 2, lines 27-66) , the claims require "a solvent selected from the group consisting of.....propylene carbonate, butylene carbonate...." in the list " a) ", **or** "a solvent mixture of sulfolane and a solvent selected from....." in the list " b) ", **or** "a solvent mixture of a sulfolane...." of the list " c) " (emphasis added). The use of the word "or " means that a solvent meeting the requirement of one of three lists " a) ", " b) ", or

" c) " would meet the claimed solvent, Morimoto discloses as a solvent, proprylene carbonate or butylene carbonate, Morimoto discloses a solvent meeting the requirement of the list "a)", in addition Morimoto also teaches the use of chlorobenzene in the electrolyte, as shown above. Note that the use of "contains" in the claims does not exclude the use of another solvent, for example sulfolane, in addition to the solvent meeting the requirement of the list "a) ". Therefore, Morimoto does teach the claimed solvent.

Concerning the specific surface area of the carbonaceous material of the electrodes, Morimoto discloses a value of $2000m^2/g$ which falls within the claimed range (see Examples 1 to 3). Note that this is a 103 rejection, not a 102 rejection, in an obviousness rejection the prior art does not have to disclose the exact claimed range (see MPEP 2144.05). Therefore, Morimoto does make obvious the limitation on the specific surface area from 100 to $3000m^2/g$.

Concerning the "maintained at reduced pressure after the voltage is applied" limitation, note that applicants' arguments are largely directed to what the cited references teach individually. However, it is axiomatic that one cannot show nonobviousness by attacking references individually where the rejection, as here, is based on a combination of references. *In re Young*, 403 F.2d 754, 159 USPQ 725 (CCPA 1968); *In re Keller*, 642 F.2d 413,208 USPQ 871 (CCPA 1981). For example, applicant argued that Morimoto does not disclose the use of a reduced pressure after the voltage is applied as here claimed. However, Wei et al. (US Patent 6152970 , "Wei") , not Morimoto, is employed in the rejection to show that feature of the claimed process. Therefore the combined teaching of Morimoto and Wei do teach or make obvious all the limitations of the claims 5, 12, and 20. Besides, applicants' arguments concerning the effect of benzene or its derivative in the water removal is found irrelevant since this is not claimed. Whether or not Morimoto discloses the same objective as applicants in using benzene in the capacitor is immaterial because the claims only require the presence of benzene or its chlorine derivative, not what benzene or its chlorine derivative does. Applicants also argued, on pages 7-9, the effect of a continuous voltage and other features disclosed in the specification but not claimed , these features may be different from the teaching of the combined Morimoto and Wei, however they are irrelevant since the rejection is done on the claims not the specification. Besides, both Morimoto and Wei disclose the application of a voltage, the use of vacuum and electrolysis of water are disclosed in Wei with details (see Wei, col. 7, line 17-col. 8, line 26).

Contrary to applicants' arguments, Wei teaches "**A fixed voltage can be applied** to the cell **or** the voltage can be cycled and /or applied in sequential steps.....Sequential application of voltage in steps and **cycling voltage can be used** to avoid current saturation **in some application** where an initial high voltage will cause a violent gas evolution that will destroy the cell" (see col. 8, lines 7-15) (emphasis added). The claims recite the application of a voltage, no details about whether the voltage has to be continuous, non-cycled. However, even if the voltage has to be fixed, the combined teaching of Morimoto and Wei still meet the claims because, as shown above, Wei does teach the use of a fixed (continuous) voltage.

Applicants also argued that there is no motivation to combine Wei with Morimoto. The examiner disagrees, at least for the effect of removing the water presence in the capacitor, a well known problem, capacitor made by the combined Morimoto and Wei's process would have eliminate or at least reduce the problems caused by the presence of water in the double layer capacitor. Therefore, a person of ordinary skill in the art is motivated to combine Wei with Morimoto and the combined teaching of Morimoto and Wei does teach or make obvious all the limitations of the claims.

Applicants argued that Tsushima (JP 100041199) does not teach the environmental atmosphere where the voltage is applied. The examiner disagrees, Tsushima teaches the application of a voltage before and after the case is sealed, as stated in the rejection. As shown by Wei, the presence of water the capacitor causes problems and degrades the capacitor with time, a fact well known in the art. Because of the large effect of moisture in the performance of the capacitor, the use of dry atmosphere would have been obvious to ensure better control of the environment and repeatability of production because, in dry air, fluctuation in humidity would be eliminated.

Applicants argued that Grigortchak et al. (US Patent 5351164) does not pertain to a double layer capacitor having organic electrolyte as claimed. The examiner disagrees, Grigortchak teaches the invention is applicable for both organic and aqueous electrolyte (see col. 2, lines 7-12).

For the above reasons, the combination of Morimoto and Wei alone or with other reference does teach or make obvious all the limitations of the claims 2-5, 7-9, 11-17, and 19-26, the rejection of the claims was proper and should be sustained.

Applicants are referred to the modified ground of rejection given below.

### *Claim Objections*

3. Claims 2-5, 7-9, 11-17, 19-26 are objected to because of the following informalities: in claims 5, 12, and 20, lines 11-12, the phrases are not completed because "substituting water adsorbed " requires another noun, for example: substitute adsorbed water with benzene. Appropriate correction is required.

Claims 2-4, 7-9, 11, 13-17, 19, 21-26 variously depend from claims 5, 12, and 20, they are objected to for the same reason.

### *Claim Rejections - 35 USC 103*

3a. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 2-5, 7- 9, 11-17, and 19-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morimoto et al. , U. S. Patent 4725927 (hereinafter Morimoto) in view of Wei et al., US Patent 6152970 (hereinafter Wei).

Morimoto discloses a method for producing an electric double layer capacitor, comprising the steps of: impregnating an element comprising positive and negative electrodes facing each other with a separator interposed between them, with an organic electrolyte

comprising benzene or its chlorine derivative having at least one hydrogen atom of benzene substituted by a chlorine atom (See col. 2, lines 49-66), said organic electrolyte being capable of forming an electric double layer on the surface of the electrodes to store electric charge (See col. 1, line 65-col. 2, line 49, col. 3, lines 37-49, and col. 5, lines 25-68 ), the impregnating resulting in the substitution of adsorbed water because of the presence of benzene in the electrolyte, it is inherent that benzene substitutes for adsorbed water to the material of the electrodes to obtain desorbed water; and then applying a voltage to the element (see col. 4, lines 31-39), wherein said positive and negative electrodes are made of electrodes containing a carbonaceous material having a specific surface area of $2000m^2/g$ (See col. 3, lines 37-46); wherein a voltage of 2.8V is applied to the element at a temperature of 85C (see col. 4, lines 40-45); wherein the organic electrolyte containing a salt comprising tetraalkyl ammonium cation, and an anion of hexafluoroarsenate (see col. 3, lines 1-14); wherein the organic electrolyte contains a propylene carbonate solvent (see col. 2, lines 27-49). It also discloses that the amount of chlorobenzene in the solvent mixture is from 10 to 70% by volume (see col. 2, lines 49-66).

But it does not disclose expressly the claimed range of specific surface area of the electrode material, the claimed ranges of applied voltage and temperature, the claimed amount of benzene or its chlorine derivative in the organic electrolyte, that the element is maintained under reduced pressure and the expelling of desorbed water from the element, and wherein the voltage is applied to the element in a dry atmosphere in an open condition.

However the missing limitations are well known in the art because Wei discloses that the element is maintained under reduced pressure after applying a voltage to electrolyze water in the capacitor (see col. 5, lines 46-53 and col. 7, line 17- col. 8, line 41), it is inherent that the desorbed water is electrolyzed and expelled, in the form of oxygen and hydrogen, from the element, the cycled voltage can be considered to be equivalent to reversing the polarity of the applied voltage to the electrodes. Wei also discloses that "gases produced by water decomposition from electrolysis are then continuously removed by the vacuum. This procedure can be used in conjunction with a dryroom operation to remove all remaining trace amounts of water from the active material ...then completely sealed ...". Wei and Morimoto also discloses ranges overlapping with the claimed ranges, a prima facie case of obviousness exists (See MPEP 2144.05 ) . Besides, the examiner interprets that the prior art teaches an amount of chlorobenzen

in a large range in term of volume, at least some of it will fall into the claimed range in term of weight.

Therefore, it would have been obvious to combined Morimoto with Wei to obtain the invention as specified in claims 2-5, 7- 9, 11-17, and 19-26.

5. Claims 3, 12-15, 17, 19, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morimoto in view of Wei, as applied above, and further in view of Tsushima Manabu, JP Patent 10041199 (hereinafter Tsushima).

The combined teaching of Morimoto and Wei discloses substantially the limitations of claims 3, 12-15, 17, 19, and 22, as shown above. In the situation where a narrow interpretation that might make the combined teaching of Morimoto and Wei insufficient for the rejection then Tsushima is also combined.

Because Tsushima discloses that the voltage in the 2.6-3.5V range is applied before and after the case is sealed and the ambient temperature is 35-85 C (See Solution).

A person of ordinary skill is motivated to modify Morimoto and Wei with Tsushima because when using Tsushima's open condition in the process of Morimoto the impurities and undesirable moisture from the components of the capacitor element can escape freely resulting in better quality capacitor.

Therefore, it would have been obvious to combine Morimoto and Wei with Tsushima to obtain the invention as specified in claims 3, 12-15, 17, 19, and 22.

6. Claims 8 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morimoto in view of Wei, as applied above, and further in view of Grigortchak et al., US Patent 5351164 (hereinafter Grigortchak).

The combined teaching of Morimoto and Wei discloses substantially the limitations of claims 8 and 25, as shown above.

But, in the case some may argued that, it does not disclose expressly the two step application of voltage to the capacitor element.

However, it is well known in the art because Grigortchak this feature (See col. 7, line 45-col. 8, line 49 ).

A person of ordinary skill is motivated to modify Morimoto and Wei with Grigortchak because when using Grigortchak's two step voltage application in the process of Morimoto and Wei an increase in capacitance and energy storage can be obtained (see Grigortchak et al., col. 8, lines 46-49).

Therefore, it would have been obvious to combine Morimoto and Wei with Grigortchak to obtain the invention as specified in claims 8 and 25.

7. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Morimoto in view of Wei or Morimoto in view of Wei and Tsushima , as applied above, and further in view of Grigortchak.

The combined teaching of Morimoto and Wei or Morimoto, Wei, and Tsushima discloses substantially the limitations of claim 16, as shown above.

But , in the case some may argued that, it does not disclose expressly the two step application of voltage to the capacitor element.

However, it is well known in the art because Grigortchak this feature (See col. 7, line 45-col. 8, line 49 ).

A person of ordinary skill is motivated to modify the combined Morimoto and Wei or Morimoto, Wei, and Tsushima with Grigortchak because when using Grigortchak's two step voltage application in the process of the combined Morimoto, Wei, and Tsushima an increase in capacitance and energy storage can be obtained (see Grigortchak et al., col. 8, lines 46-49).

Therefore, it would have been obvious to combine Morimoto, Wei, and Tsushima with Grigortchak to obtain the invention as specified in claim 16.

***Conclusion***

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ha Nguyen whose telephone number is (703)308-2706 . The examiner can normally be reached on Monday-Friday from 8:30AM to 6:00PM, except the first Friday of each bi-week.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Niebling, can be reached on (703) 308-3325. The fax phone number for this Group is (703) 308-7722.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0956.

Ha Nguyen
Primary Examiner
04 - 29 - 03